

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte QIAN LIN

Appeal 2007-0017
Application 10/074,179¹
Technology Center 2600

Decided: April 11, 2007

Before JAMES D. THOMAS, JOHN C. MARTIN, and LEE E. BARRETT,
Administrative Patent Judges.

BARRETT, *Administrative Patent Judge.*

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134(a) from the Final Rejection of claims 14-19 and 27. Claims 1, 2, 20, and 25 have been canceled. Claims 3-13, 21-24, and 26 have been allowed. We have jurisdiction pursuant to 35 U.S.C. § 6(b).

We reverse.

¹ Application filed February 12, 2002, entitled "Method and System for Assessing the Photo Quality of a Captured Image in a Digital Still Camera."

BACKGROUND

The claims are directed to a method for assessing, in-camera, the photo quality of a captured image in a digital camera and providing visual or audio feedback of the photo quality to a camera user.

Claim 14 is illustrative:

14. A method for assessing the photo quality of a captured image in a digital camera, said method comprising:

checking, in-camera, the photo quality of the captured image to determine if the photo quality is acceptable; and

providing a corresponding photo quality feedback to a camera user wherein said checking step further comprises:

computing a face quality figure of merit for the captured image; and

comparing said computed face quality figure of merit to a threshold to determine if said face quality figure of merit exceeds said threshold.

THE REFERENCES

The Examiner relies on the following prior art references:

Lin	US 6,016,354	Jan. 18, 2000
Luo	US 6,134,339	Oct. 17, 2000
Ina	US 6,298,198 B1	Oct. 2, 2001
Cheatle	US 2002/0191861 A1	Dec. 19, 2002 (filed Dec. 20, 2001)

THE REJECTIONS

Claim 14 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Ina and Luo. The Examiner finds that Ina discloses the claimed invention except for last limitation of "comparing said computed face quality figure of merit to a threshold to determine if said face quality figure of merit exceeds said threshold." The Examiner finds that this limitation was well known in the art as taught by Luo and concludes that it would have been obvious to modify Ina to provide the comparing step as taught by Luo since "such a modification would enable enhancement and manipulation of images containing one or more human faces, so that, red-eye correction can be reliably performed" (Final Rejection 6-7).

Claims 15-18 and 27 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Ina and Luo, further in view of Cheadle.

Claim 19 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Ina and Luo, further in view of Lin.

DISCUSSION

Issues

The issues argued with respect to independent claim 14 are: (1) Does Ina disclose "checking, in-camera, the photo quality of the captured image to determine if the photo quality is acceptable"?; (2) Does Ina disclose "computing a face quality figure of merit for the captured image"; and (3) Does Luo make up for the deficiencies of Ina? We answer each of these questions in the negative based on the following analysis.

Content of Ina

Ina discloses a verifying camera, which is a type of hybrid film-electronic camera in which the user has an opportunity to check the captured film images immediately after capture using a concurrently recorded electronic image. A shortcoming of such cameras is that the exposure time required for the electronic array imager is often much shorter than the exposure time for the film. This shorter exposure time "stops" a motion of the photographic subject that is recorded on the film as a blur, so that the captured electronic image is not fully accurate for verification purposes. *See* col. 1, lines 24-35. For example, in Figure 14, if the "smiley" face subject image 28 moves, the latent image 30 on the film shows a blur, but an electronic (digital) image taken at the same time, say image 128, would stop the motion and not show a blur. Ina's invention is to capture a first electronic (digital) image 128 at the beginning of the film exposure time interval and to capture a second digital image 130 at the end of the film exposure time interval and to combine the images in an image 134 so that the user may determine whether the resultant image is blurred. With reference to Figure 2, the first digital image is stored in memory 98a, the second digital image is stored in memory 98b, and the images are combined by processor 92 and combiner 132 to be displayed on image display 40 (col. 7, l. 64, to col. 8, l. 23). Controller 100 calculates exposure parameters for the film exposure, the shutter times for the electronic exposure of the imager, and the aperture for the image paths (col. 6, l. 50, to col. 7, l. 6).

Content of Luo

Luo relates to determining the position of a pair of eyes within a captured image frame using the red-eye effect, which eye location can be used for spatial normalization of the face for face recognition, model-based face image compression, etc. (col. 6, ll. 46-56). In addition, eye movement and iris motion can be monitored to check if a driver is still alert (col. 6, ll. 56-57). Two color frames of an image scene are captured with minimum delay: one frame is captured with ambient illumination and another frame is captured with additional illumination (col. 8, ll. 6-11). Brightness compensation, differencing, and confirmation operations are performed to determine a difference image which is then scanned for regions of high intensity pixel value in the red channel to locate the pupils (col. 8, ll. 12-29). Once the spatial coordinates are obtained, the eye-defect correction may be performed automatically in the digital camera or the coordinates may be recorded for correction in a photo-finishing lab (col. 8, ll. 29-36).

Issue 1: Does Ina disclose "checking, in-camera, the photo quality of the captured image to determine if the photo quality is acceptable"?

Arguments

The Examiner finds (Final Rejection 5) that the processor 92 and controller 100 in Ina perform the step of "checking, in-camera, the photo quality of the captured image to determine if the photo quality is acceptable." The Examiner points to Figures 7, 11, and 14, and column 7, lines 50+, column 8, lines 25+, and column 9, lines 5+.

Appellant argues that Ina does not disclose "checking, in-camera, the photo quality of the captured image to determine if the photo quality is acceptable." It is argued that Ina is directed to a camera which digitally combines two digital images and displays the resultant image to the user for manual verification of motion, and not to a camera for "checking, in-camera" the photo quality of a captured image (Br. 9). That is, the user, and not a processor in the camera, makes the actual determination of whether the photo quality is acceptable (Br. 10). Appellant addresses each of the sections of Ina cited by the Examiner and finds that none of the sections could reasonably be interpreted to indicate that the processor 92/100 determines the quality of the captured image (Br. 10-12).

The Examiner responds that "the images stored in the memory 98a/98b are combined by the processor 92 **to check, in camera, the photo quality of the captured image to determined [sic] if the photo quality is acceptable** (i.e., see col. 8, lines 5-20) as recited in present claimed invention" (Answer 10-11).

Appellant replies that Ina merely discloses that two images are combined to enable a *user* to determine whether there was a relative movement between the time the two images were captured, and this checking is not done "in-camera" (Reply Br. 4). Appellant argues that the Examiner has apparently interpreted "in-camera" to include processes that occur in the camera as well as processes performed by the user, and this interpretation is improper because "in-camera" clearly denotes that checking

of the image photo quality is performed by components contained in the camera (Reply Br. 5).

Analysis

As a matter of claim interpretation, we agree with Appellant that "checking, in-camera, the photo quality of the captured image to determine if the photo quality is acceptable" means that checking the photo quality is done by components in the camera and does *not* include the user determining the photo quality. The Examiner has not attempted to provide a different interpretation of the limitation. The processor 92 merely combines two digital images, and does not check the quality of the captured images, e.g., by comparing the two images. The controller 100 calculates parameters for *taking* the images, and does not check the quality of the captured images. No elements in Ina calculate any quantity that corresponds to a photo quality of captured image. In Ina, it is the human user that must look at the combined image (e.g., 134 in Fig. 14) to determine the photo quality, where the photo quality is "blurring." The Examiner, in fact, finds that "the feedback image is display[ed] on the LCD 40 of the camera so . . . the quality of the image can be determined by the user during the image capturing process" (Final Rejection 6), indicating that checking the photo quality is not done "in-camera." Ina does not disclose "checking, in-camera, the photo quality of the captured image to determine if the photo quality is acceptable."

Issue 2: Does Ina disclose "computing a face quality figure of merit for the captured image"?

Arguments

The Examiner finds that the controller 92/100 of Ina computes a "face quality of merit" which is the face quality of the images in Figure 14 (Final Rejection 6).

Appellant argues that Ina does not disclose "computing a face quality figure of merit for the captured image." It is argued that a "face quality figure of merit" is described in the Specification as a number of different attributes of a face detected in the captured image which are computed in the camera (Br. 13). Appellant argues that the "smiley" face representation of the subject image 28 in Figure 14 is merely a representation of any possible subject matter and is not intended to indicate that the subject image 28 constitutes a face because Ina never directly discusses images of faces (Br. 14). It is argued that the Examiner fails to clearly define how the term "face quality figure of merit" is interpreted or what the Examiner considers to correspond to this term (Br. 15).

The Examiner responds that the controller 100 and processor 92 compute the first and second exposure time intervals 146, 148 in Figure 10 and combine the first and second images 128, 130 to determine the "face quality figure of merit," which the Examiner considers to be the blurred image 134 in Figure 14 (Answer 11-12).

Appellant replies that the exposure time has nothing to do with computing a face quality figure of merit (Reply Br. 6-7). It is argued that Ina never states that the camera is capable of computing the degree to which the resultant image is blurred and the camera is incapable of informing a user whether the image is blurred (Reply Br. 7).

Analysis

The limitation of "computing a face quality figure of merit for the captured image" is a further limitation of the "checking" step, which is done "in-camera," and should be interpreted to mean computing in the camera an attribute of a face detected in the captured image, i.e., computing a number representative of the quality of a face in the image. Ina does not compute a number representative of the quality of a face or any other image. The computations by the processor 92 are to combine two whole images into one, and the computations by the controller 100 are to set exposure parameters. Neither of these operations relate to computing a "face quality figure of merit" or computing anything to do with the quality of the image. While the user may subjectively judge a "face quality" from the combined image 134 in Figure 14, wherein the "smiley" face at least suggests a face, this does not meet the limitations of computing a face quality figure of merit in-camera. Ina does not disclose "computing a face quality figure of merit for the captured image."

Issue 3: Does Luo make up for the deficiencies of Ina?

Arguments

Appellant argues that the Examiner has failed to indicate exactly what feature in Luo corresponds to the "computed face quality figure of merit" or what is considered to be the "threshold" and where Luo discloses comparing the "computed face quality figure of merit" to a "threshold," which makes it difficult to determine why Luo has been cited (Br. 17). It is argued that Luo discloses using red-eye detection for locating eyes in an image and that eye-defect correction may automatically be performed once the eye locations are determined, but does not disclose computing a face quality figure of merit in-camera as part of a checking step to determine photo quality or comparing a computed face quality figure of merit to a threshold to determine if it exceeds the threshold (Br. 17).

The Examiner responds that computing a face quality figure of merit corresponds to computing an eye-defect such as red-eye and comparing the peak value to a threshold to determine if the face quality figure of merit exceeds the threshold (Answer 12). In particular, the Examiner refers to step 46 in Figure 8 as showing a threshold.

Appellant replies that Luo is not concerned with determining whether the quality of an image is acceptable, but only determines the locations of eyes using the red-eye phenomenon and compensates for the detected red-eye (Reply Br. 9)

Analysis

Appellant discloses that computing a face quality figure of merit is done in several steps, where the camera computes: "(a) a brightness figure of merit, (b) a noise level figure of merit, (c) a contrast figure of merit, and (d) to check for the presence/absence of red eye in the respective detected regions" (Specification para. 0088). Red-eye is not characterized as having a figure of merit. Nevertheless, for the sake of argument, we assume that the phrase "face quality figure of merit" in the claim is broad enough to read on a value that represents the presence or absence of red-eye..

Luo detects the location of red-eye. The detection of red-eye is considered an indication of the photo quality, with the presence of red-eye being unacceptable. Nevertheless, Luo does not provide "photo quality feedback to a camera user," as claimed, because the red-eye is automatically corrected in the camera or in the photo-finishing lab. That is, the camera user would not be notified of the presence of red-eye so that the user could take another picture. Thus, neither Ina nor Luo discloses providing "photo quality feedback to a camera user," so, even if the references were combined, the combination would not teach the invention of claim 14. Moreover, the Examiner only relies on Luo for a teaching of the limitation of "comparing said computed face quality figure of merit to a threshold to determine if said face quality figure of merit exceeds said threshold," and we find no motivation to modify Ina to have a threshold since Ina does not

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compute a face quality figure of merit that it capable of being compared to a threshold. Therefore, Luo does not make up for the deficiencies of Ina.

Conclusion

For the reasons stated above, the rejection does not establish a prima facie case of obviousness. The rejection of claim 14 is reversed.

The Examiner does not rely upon Cheatle or Lin, which are applied in the rejections of dependent claims 15-19 and 27, to meet any of the limitations in claim 14. We decline to consider whether Cheatle or Lin would cure the deficiencies in the rejection of claim 14. The rejections of claims 15-19 and 27 are reversed.

CONCLUSION

The rejections of claims 14-19 and 27 are reversed.

REVERSED

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